

Differentiation Between Arabica and Robusta Brazilian Roasted Coffees Using HS-SPME and SDE Gas Chromatography-Mass Spectrometry and Principal Component Analysis

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SUMMARY

The two major species of coffee, *Coffea arabica* and *Coffea caneffora* var. *robusta*, are markedly different in chemical composition and this reflects in the flavor fraction of each species after roasting. In this study, Brazilian roasted coffee, *arabica* and *robusta*, from several geographic regions, were evaluated. Simultaneous distillation-extraction (SDE) and headspace solid-phase microextraction (HS-SPME) were compared for their effectiveness in the extraction of volatile compounds and ability to differentiate the different species. The compounds were identified by gas chromatography-mass spectrometry (GC-MS) and principal component analysis (PCA) was applied to the major components of a flame ionization detector chromatographic response. The number of extracted compounds identified by both methods was 78 and 108 for SDE and HS-SPME, respectively. The main classes of compounds were furans, phenolics, pyrroles and pyrazines, in both extracts. When using SDE-GC-MS and FID and HS-SPME-GC-MS and FID, associated to PCA, a good separation between *arabica* and *robusta* roasted coffees were observed in both techniques. By SDE, the most representative differentiation compounds were pyridine, methyl pyrazine, furfural, 5-methyl-2-furancarboxaldehyde, 2-methoxyphenol, 3-methylbutanoic acid and 4-vinyl-2-methoxy-phenol. By SPME, the compounds were furfuryl acetate, 2-acetyl-5-methylfuran, 5-methyl-2-furancarboxaldehyde, phenol, 2-methoxyphenol, 4-ethyl-2-methoxy-phenol and 4-vinyl-2-methoxy-phenol.